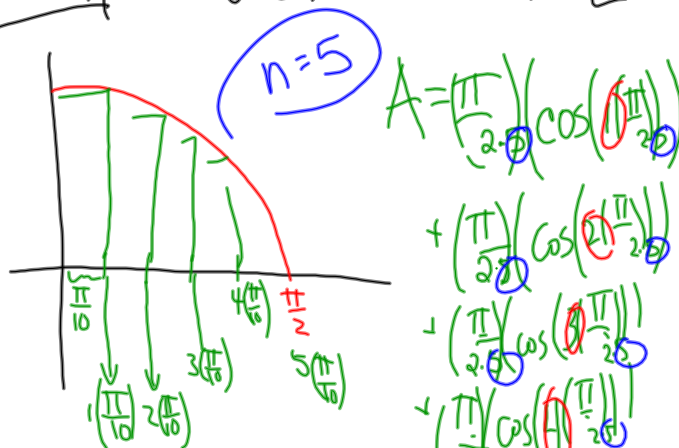


6.1/4  $f(x) = \cos x ; [0, \frac{\pi}{2}]$



$$\sum_{K=1}^5 \left( \frac{\pi}{10} \right) \left( \cos \left( \frac{K\pi}{10} \right) \right)$$

$$A = \left( \frac{\pi}{2 \cdot 5} \right) \left( \cos \left( \frac{\pi}{20} \right) \right) + \left( \frac{\pi}{2 \cdot 5} \right) \left( \cos \left( \frac{2\pi}{20} \right) \right) - \left( \frac{\pi}{2 \cdot 5} \right) \left( \cos \left( \frac{3\pi}{20} \right) \right) - \left( \frac{\pi}{2 \cdot 5} \right) \left( \cos \left( \frac{4\pi}{20} \right) \right) + \left( \frac{\pi}{2 \cdot 5} \right) \left( \cos \left( \frac{5\pi}{20} \right) \right)$$

$\text{Sum}(\text{seq}((\pi/p)(\cos(X\pi/10)), X, 1, 5))$

$$\sum_{K=1}^N \left( \frac{\pi}{2N} \right) \left( \cos \left( \frac{K\pi}{2N} \right) \right)$$

turn on calculator  
type 20 enter

$\boxed{\text{STO} \rightarrow} \boxed{\text{ALPHA} \text{N}} \text{ enter}$

$$\text{SUM}(\text{SEQ}(\pi/(2N) * \cos(X\pi/(2N))), X, 1, N)$$

100 enter  
 $\boxed{\text{STO} \rightarrow} \text{N}$  100 enter  
 100  
 $\text{2ND entry}$   $\text{2ND entry}$   $\text{2ND entry}$  enter



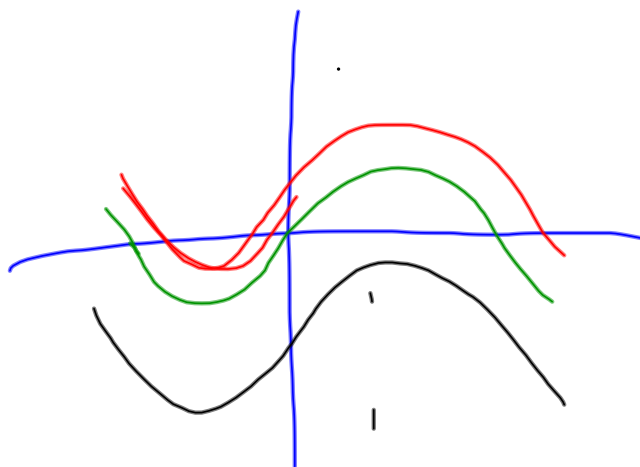
The image shows the integral expression  $\int f(x) dx$  written in black ink. A green oval is drawn around the entire expression. A red arrow points upwards from below the  $f(x)$  term. There are also small red marks below the integral sign and the differential  $dx$ .

$\equiv$  the anti-derivative  
of  $f(x)$

$$\Rightarrow \frac{d}{dx} \left[ \int f(x) dx \right] = f(x)$$

$$\int \cos x \, dx = \sin x + C$$

$$\int \sin x \, dx = -\cos x + C$$



$$\frac{d}{dx} (x^n)$$

① multiply by  
exponent

② subtract  
1 from exponent

$$\int x^n dx$$

① add 1 to  
exponent

② divide by  
new exponent

$$\frac{x^{n+1}}{n+1} + C$$

$$\int x' dx = \frac{x^2}{2} + C$$

$$\int x^2 dx = \frac{x^3}{3} + C$$

$$\begin{aligned}\int \frac{1}{x^2} dx &= \int x^{-2} dx = \frac{x^{-1}}{-1} + C \\ &= -\frac{1}{x} + C\end{aligned}$$

$$\int \frac{1}{x} dx = \int x^{-1} dx = \frac{x^0}{0} \times$$

$$\frac{d}{dx}(\ln x) = \frac{1}{x}$$

$$\int \frac{1}{x} dx = \ln x + C$$

$$\begin{aligned}
 \lim_{x \rightarrow ?} c f(x) &= c \lim_{x \rightarrow ?} f(x) \\
 \frac{d}{dx} (c f(x)) &= c \frac{d}{dx} (f(x)) \\
 \int c f(x) dx &= c \int f(x) dx
 \end{aligned}$$

$$\lim_{x \rightarrow ?} (f(x) + g(x)) = \lim_{x \rightarrow ?} f(x) + \lim_{x \rightarrow ?} g(x)$$

$$\frac{d}{dx}(f(x) + g(x)) = \frac{d}{dx}(f(x)) + \frac{d}{dx}(g(x))$$

$$\int (f(x) + g(x)) dx = \int f(x) dx + \int g(x) dx$$



$$\lim_{x \rightarrow ?} f(x) \cdot g(x) = \left[ \lim_{x \rightarrow ?} f(x) \right] \left[ \lim_{x \rightarrow ?} g(x) \right]$$

if  $\lim f$  &  $\lim g$  exist

$$\frac{d}{dx} (f(x) \cdot g(x)) = \text{product rule}$$

$$\int f(x) \cdot g(x) dx = \text{NOT able to be done}$$

(unless integration by parts or substitution works)

6.2 3-31  
|

6.2/  
three through  
thirty-one

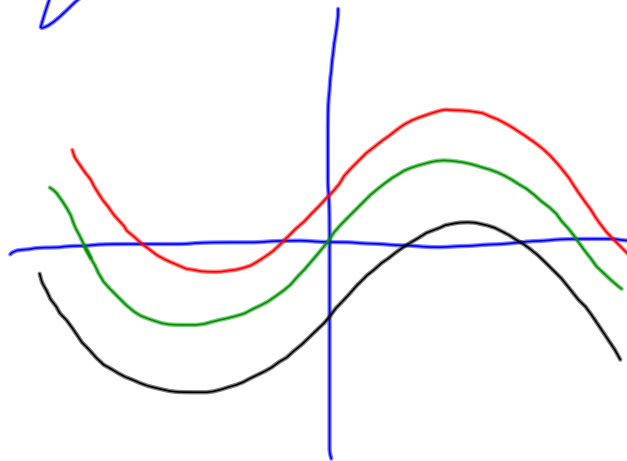
## 6.2] Antiderivatives

$\int f(x) dx \equiv$  the anti-derivative  
of  $f(x)$   
(i.e. the function  
whose derivative is  
 $f(x)$ )

$$\int f(x) dx$$

Integral  $\equiv$  "indefinite" integral

$$\int \cos x \, dx = \sin x + C$$



$$\int \sin x \, dx = -\cos x + C$$

$$\frac{d}{dx}(x^n)$$

1) multiply by  
exponent

② subtract 1  
from exponent

$$n x^{n-1}$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C$$

1) add 1 to exponent

2) divide by new  
exponent

$$\int x^1 dx = \frac{x^2}{2} + C$$

$$\int x^2 dx = \frac{x^3}{3} + C$$

$$\begin{aligned}\int \frac{1}{x^2} dx &= \int x^{-2} dx = \frac{x^{-1}}{-1} + C \\ &= -\frac{1}{x} + C\end{aligned}$$

$$\int \frac{1}{x} dx = \int x^{-1} dx = \frac{x^0}{0} \times$$

$$\frac{d}{dx}(\ln x) = \frac{1}{x}$$

$$\therefore \int \frac{1}{x} dx = \ln x + C$$

$$\lim_{x \rightarrow ?} c f(x) = c \lim_{x \rightarrow ?} f(x)$$

$$\frac{d}{dx} (c f(x)) = c \frac{d}{dx} (f(x))$$

$$\int c f(x) dx = c \int f(x) dx$$



$$\lim_{x \rightarrow ?} [f(x) + g(x)] = \lim_{x \rightarrow ?} f(x) + \lim_{x \rightarrow ?} g(x)$$

$$\frac{d}{dx} (f(x) + g(x)) = \frac{d}{dx} (f(x)) + \frac{d}{dx} (g(x))$$

$$\int f(x) + g(x) dx = \int f(x) dx + \int g(x) dx$$

$$\lim_{x \rightarrow ?} f(x) \cdot g(x) = \left[ \lim_{x \rightarrow ?} f(x) \right] \left[ \lim_{x \rightarrow ?} g(x) \right]$$

if both exist

$$\frac{d}{dx} (f(x) \cdot g(x)) \Rightarrow \text{PRODUCT RULE}$$

$$\int f(x) \cdot g(x) dx = \text{CAN'T be done}$$

[unless integration by parts  
or substitution works]

